CLAIMS

1. A method for producing a sealed ^{210}Pb-^{210}Po α source (α particle emitter) comprising the steps of:

collecting ^{210}Pb-^{210}Po with a ^{210}Pb collector using radon collection;

precipitating the hydroxides of the collected ^{210}Pb-^{210}Po and collecting the precipitates using a polycarbonate (PC) filter;

dissolving the ^{210}Pb-^{210}Po hydroxide precipitates to form a ^{210}Pb-^{210}Po radioactive thin film; and

sealing the ^{210}Pb-^{210}Po radioactive thin film for protection.

2. The method for producing a sealed ^{210}Pb-^{210}Po α source (α particle emitter) according to claim 1, wherein the step of collecting ^{210}Pb-^{210}Po with a ^{210}Pb collector using radon collection is a ^{210}Pb-^{210}Po collection process characterized in that

a substance containing uranium series radioactive nuclides is used as a ^{222}Rn source, ^{222}Rn generated from the ^{222}Rn source is passed along with a carrier gas through a cold trap that is cooled to a temperature at or below a boiling point of ^{222}Rn (-62°C) to liquefy the ^{222}Rn, and ^{210}Pb-^{210}Po among daughter nuclides generated by the decay of the liquefied ^{222}Rn is collected by taking the ^{210}Pb-^{210}Po adhering to the cold trap wall sides or remaining in

the cold trap, which has returned to room temperature, into a solution using a solvent for collecting.

3. The production method according to claim 2, wherein the ^{222}Rn source is selected from the group consisting of natural uranium ore powder and a radium source.

4. The production method according to claim 2, wherein the carrier gas is selected from the group consisting of nitrogen and dry air.

5. The production method according to claim 2, wherein the solvent for dissolving ^{210}Pb-^{210}Po is selected from the group consisting of nitric acid, sulfuric acid and hydrochloric acid solution.

6. The method for producing a sealed ^{210}Pb-^{210}Po α source (α particle emitter) according to claim 1, wherein the step of precipitating the hydroxides of the collected ^{210}Pb-^{210}Po and collecting the precipitates by a polycarbonate (PC) filter is a process in which the hydroxide precipitate is prepared by adding excess ammonium hydroxide solution to nitric acid, sulfuric acid or hydrochloric acid solution containing ^{210}Pb and ^{210}Po which is a nuclide generated from decay of ^{210}Pb, the precipitate is settled, and then the ^{210}Pb and ^{210}Po made into a hydroxide precipitate is collected using the PC filter.

7. The method for producing a sealed ^{210}Pb-^{210}Po

α source (α particle emitter) according to claim 1, wherein the step of dissolving the ^{210}Pb-^{210}Po hydroxide precipitate to form a ^{210}Pb-^{210}Po radioactive thin film is a process in which the PC filter that has collected ^{210}Pb and ^{210}Po as hydroxide precipitate is dissolved in a mixed solvent of dichloroethane and dichloromethane, and the resultant solution is dripped to form a thin film of 1 micron or less by natural evaporation of the solution.

8. The production method according to claim 7, wherein the mixing ratio of the dichloroethane and dichloromethane is 1:1.

9. The method for producing a sealed ^{210}Pb-^{210}Po α source (α particle emitter) according to claim 1, wherein the step of sealing the ^{210}Pb-^{210}Po radioactive thin film protection is a process in which a separate PC filter is dissolved in a mixed solvent of dichloroethane and dichloromethane, and the resultant solution is dripped onto a thin film prepared in accordance with the process of claim 7 to form a thin film of 1 micron or less.

10. The production method according to claim 9, wherein the mixing ratio of dichloroethane and dichloromethane is 1:1.

11. The method for producing a sealed ^{210}Pb-^{210}Po α source (α particle emitter) according to any of claims 7 to 10, characterized in that the content of

^{210}Pb-^{210}Po atoms is controlled by controlling the solution amount extracted for dripping.

12. A ^{210}Pb collector which uses radon collection for collecting ^{210}Pb-^{210}Po, which comprises:

a ^{222}Rn source which includes a substance containing uranium series radioactive nuclides;

a moisture trap for collecting ^{222}Rn gas generated by the ^{222}Rn source along with a carrier gas and sending only pure radon gas to a cold trap; and

a ^{222}Rn collector trap for liquefying the ^{222}Rn gas by cooling to a temperature at or below the boiling point of ^{222}Rn (-62°C) and then generating ^{210}Pb and ^{210}Po which have a relatively long half-life among daughter nuclides generated from decay of the ^{222}Rn.

13. The collector according to claim 12, wherein the ^{222}Rn source is selected from the group consisting of natural uranium ore powder and a radium source.

14. The collector according to claim 12, wherein the carrier gas is selected from the group consisting of nitrogen and dry air.